

Unit 11

Day 4

Midpoint and Distance

Section 3.1 from book

$$\textcircled{6} \quad (2, 4), m = -1$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = -1(x - 2)$$

$$y - 4 = -x + 2$$

$$x + y = 6$$

$$-1 = \frac{y - 4}{x - 2}$$

$$-x + 2 = y - 4$$

$$x + y = 6$$

⑬

x-int 3 (3, 0)
y-int -2 (0, -2)
b

$$m = \frac{-2 - 0}{0 - 3} = \frac{2}{3}$$

$$y = mx + b$$
$$y = \frac{2}{3}x - 2$$

Midpoint Formula- the midpoint of a segment is equidistant to the endpoints of the segment.

Endpoints (a,b) (c,d) has a midpoint of $(\frac{a+c}{2}, \frac{b+d}{2})$

Ex1: Endpoints (-7,8) (3,1)

$$\begin{aligned} \text{midpoint} &= \left(\frac{-7+3}{2}, \frac{8+1}{2} \right) \\ &= (-2, 4.5) \end{aligned}$$

Ex2: endpoint ^A(6,-1)

midpoint (-2,5)

endpoint? ^B(10,11)

$$\begin{aligned} -2 &= \frac{6+x}{2} \\ -4 &= 6+x \\ -10 &= x \end{aligned}$$

$$\begin{aligned} 5 &= \frac{-1+y}{2} \\ 10 &= -1+y \\ 11 &= y \end{aligned}$$

Distance formula- used to find the numerical distance between two points in a coordinate plane.

Given two points $A(x_1, y_1)$ & $B(x_2, y_2)$

$$\text{distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$C = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Ex3: Find the distance
between (5,-3) & (3,1)

$$d = \sqrt{(5-3)^2 + (-3-1)^2}$$

$$d = \sqrt{4 + 16}$$

$$d = \sqrt{20} = 2\sqrt{5}$$

~~$$2 + 4$$~~

$$1 \pm \sqrt{7}$$

Ex4: Find the value of r
so (-4,r) & (-5,1) has
a distance of $3\sqrt{2}$.

$$3\sqrt{2} = \sqrt{(-4+5)^2 + (r-1)^2}$$

$$3\sqrt{2} = \sqrt{1 + r^2 - 2r + 1}$$

$$3\sqrt{2} = \sqrt{r^2 - 2r + 2}$$

$$18 = r^2 - 2r + 2$$

$$\begin{aligned} a &= 1 \\ b &= -2 \\ c &= -16 \end{aligned} \quad r^2 - 2r - 16 = 0$$

$$r = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$r = \frac{2 \pm \sqrt{4 - 4(1)(-16)}}{2}$$

$$r = \frac{2 \pm \sqrt{68}}{2} = \frac{2 \pm 2\sqrt{17}}{2}$$

HW pg 175-179 1,2,18-24,30-32,64-68 even 71,72,73,77,81
& Wksht 1-3 all

